HEALTH BY EXERCISE

WITHOUT APPARATUS

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PROF. NISSEN'S theory and practice of physical culture I have known since he has resided in this city, and I believe them to be admirable. They are founded on the well-known and well-approved Ling system, and can be studied with great advantage by all, but especially by school officers, teachers, and parents.

The following pages contain wisely-selected exercises, which can be practised both by girls and boys at home and at school without the aid of apparatus. When Prof, Nissen uses apparatus, it is well selected, and adapted not to strain and injure, but to promote healthy growth; to make men and women of sound minds and healthy bodies. The methods advised by Prof. Nissen, while fitted to benefit all persons, are pre-eminently serviceable to those who have any physical weakness or defect which may be remedied by exercise.

JOHN EATON,
Commissioner.

PREFACE.

Since my professional establishment in Washington I have been frequently asked to write and publish a short treatise on the Swedish Gymnastic System, as it should be used for the promotion and preservation of health. This was particularly desired by persons, who, either as parents or as teachers, were deeply interested in the normal and harmonious development of the young; and who believed in the conscientious use of means best adapted to fit them for the work of life.

In writing the following pages it was not my plan to consider this subject exhaustively, still less to discuss the treatment of diseased conditions, by movement and massage, but rather to demonstrate how much really practical work may be done with simple means, and how admirably designed the Swedish system is for the maintenance of a sound bodily organism and functions in persons of all ages.

This little book has been written under the pressure of manifold engagements, and it does, I know, but scant justice to the subject, partly on account of the limited space within which it was thought well

to keep its contents, and partly because of my imperfect knowledge of the language. Still I venture to hope that it will supply instruction and practical information calculated to meet a present want which is felt by many who realize their responsibilities towards themselves, and towards others who look to them for guidance.

HARTVIG NISSEN.

WASHINGTON, D. C., March, 1885.

HEALTH BY EXERCISE.

WHY WE SHOULD TAKE EXERCISE.

That health is the chief foundation of happiness, is an observation so common as to be trite.

Health is dependent upon, and is the result of, the balance of duly vigorous physical processes and functions. It is generally admitted that judicious exercise is important and even indispensable for establishing and maintaining this balance; but practical recognition and realization of the fact do not so widely prevail. The importance of exercise becomes most readily apparent by observing persons who, from choice or controlling circumstances, take little or none; for in them we find a degree of vigor and strength much below the average. And this is especially noticeable in the wealthier class, whose members are ordinarily far better conditioned than their neighbors for attaining the best physical development. As a rule they adopt walking as their only regular, and even irregular form of exercise; but this is very defective, in that it calls only the leg muscles into vigorous action, leaving four other great classes of muscles for the most part unused.

These are the muscles of the shoulders, chest, abdomen, and back. The first serve for moving the arms, and the second for expanding the chest for respiration. And since the circulation, as well as the condition of the blood, depends upon the respiration (the blood being chemically changed, energized, and refined in its passage through the lungs), it is apparent that the energy of the whole process of physical life is directly dependent on the power with which this function is performed. Not only by lack of exercise in general, but especially by want of motion of the arms, respiration is weakened and rendered imperfect, and as a consequence, the elastic wall of the chest is either not fully expanded and developed, or becomes abnormally contracted : —

1. The blood being, from this cause, insufficiently oxygenized in the lungs, it is obvious that the conditions established are favorable to diseases of the heart and lungs, and other organs.

2. The muscles of the abdomen, lying between the ribs and pelvis, aid, by their contractile power, in strengthening the functions of the abdominal organs, such as digestion, secretion, and peristaltic action, besides co-operating most efficiently with the thoracic muscles in the act of respiration, and with others for producing a variety of movements. The importance of preserving the elasticity and strength of this class of muscles is, therefore, obviously great.

Digestion and respiration are among the most important processes of the physical economy; for, by the one, the blood is formed from the nutritive elements of food, and by the other it is purified and energized, to the end that it may maintain the organic renovation, which is the fundamental condition of life and health. These processes must, therefore, stand in vigorous and harmonious relation to each other and the rest of the organism.

3. The muscles of the back move the trunk axially, and in other directions; and, by keeping it erect, co-operate with those which govern respiration; they hinder any cramping of the stomach and other abdominal organs, whereby the latter are enabled to perform their functions as freely as possible. It is thus easy to perceive that development of these muscles of the trunk will not only prevent curvature or crookedness, but a train of evils of greater consequence. It is, however, a fact of still more importance that their due exercise tends directly to strengthen the spinal column, and hence nearly all nervous diseases, dependent upon weakness of the spine, may be avoided, besides providing the best of all protections against general debility or illness, and consequent nervous irritability.

Considering, then, the value of general exercise, and especially of the classes of muscles I have indicated, the question of most practical importance is, —

How shall exercise be taken? or *what kind of exercise is best?*

Two great systems are open to selection, — the Swedish and the German. The latter provides gymnasiums or "Turnvereins," employing a more or less extensive fixed apparatus, and (in most cases) an instructor; but it is calculated to develop acrobatic strength and skill, rather than what is incomparably more valuable, namely, a harmonious and healthy body. Institutions of this class, unprovided with an educated teacher, are especially objectionable, for, without due instruction, the ordinary gymnast can never obtain a proper development. He does not know *what* movements are best, or *how* to perform them effectively, therefore, he simply does as well as he can what he has observed others do before him, and often seeks to excel them in one or more forms of exercise; which, regarded from the health standpoint, is usually the most injurious thing possible, and often a principal reason why the gymnast breaks down prematurely. He should not be left to follow his mere preferences, for they are blind guides. He requires to be carried rightly through a properly selected and carefully graded succession of movements.

With the aid of a skilful instructor, far better results are of course attained; at the same time, the serious objection remains, that the German system consists mainly in the use of extensive apparatus,

although some preliminary exercises are used, — "free-standing gymnastics," — mostly taken from the Swedish system, which, being employed indiscriminately, or without any order, fail to answer their purpose. The use of no one or two forms, or sets, of apparatus can give the body a full and proper development. It is absolutely necessary, in the application of this system, to utilize a variety of ready apparatus; and this requires a large hall and a full knowledge of the various movements to be performed on each. With such accessories, and possessed of a thorough knowledge of anatomy, and the movements required, — both indispensable, — the teacher may be able to give his pupils a rational development. But all the elements necessary to success are with difficulty, and therefore rarely, combined. In families, and in all schools, where the necessity for the use of some proper system of exercise is greatest, exercise on this plan is practically impossible. Taken in its best development, therefore, the German system fails to meet the public want.

But aside from this, it should be carefully noted that, while a great development of mere muscle and proportionate strength may be attained by the German method, when systematically followed, it does not produce a harmonious development of the body; for, as observation readily proves, the German gymnasts (the "Turners") have not unfrequently a bad or ill-proportioned figure.

In gymnasiums, we frequently find that men with strong arms and well-developed chests are constantly swinging clubs, or performing other movements with arm apparatus, which they can do well, while they do nothing worthy of mention to develop the legs or abdominal muscles; which remain, in consequence, disproportionately small and weak. On the other hand, men having strong legs, incline to constantly develop them, leaving the arms and upper portion of the trunk without proper exercise. In this connection, it may be stated that many popular sports, such as bicycling, base-ball, and even rowing, although among the best, also give an incomplete and "one-sided" exercise, and hence a partial development. Yet the performer, equally from inexperience and ignorance, and often from a certain *esprit du corps*, will stoutly champion his own practice as superior to others.

Examination and observation render it clear that any system or form of exercise by which some parts of the body are developed at the expense of others, is fundamentally faulty; and should only be saved from utter condemnation by proof that, in the aggregate, it does more good than harm.

The Swedish system is not open to these charges, for it is especially calculated to give a full and harmonious development of *all* parts of the body; thus tending to preserve the health, and effect the cure of disease. It gives full and ready command of all

the muscles, as well as an excellent discipline to the pupils, and that too without the aid of any apparatus or special gymnastic hall. It is, therefore, justly claimed as the best, and as the only one adapted for families and schools.

It differs materially from the so-called "calisthenics," which include a variety of more or less graceful movements, calculated to please young ladies, but fail to give a desirable harmonious development to the muscles, uniformity and power to the circulation, and strength to the nervous system. Indeed in many, perhaps most cases, the calisthenic movements are so badly performed as to result in harm rather than the good expected. Such movements are often based on no correct physiological principle whatever, and are thus essentially unlike the Swedish gymnastics, into which Ling, their great originator, introduced no movement of which he could not demonstrate the physiological effect.

Yet, although more than half a century has elapsed since Ling gave this system to the world, it has been properly established in only a few of the large cities of the United States, and in general is almost unknown in this country. It is, however, used in the armies as well as the schools of Scandinavia, and also been introduced into English schools, and to a large extent into the armies and schools of Germany and France.

Every year a number of skilful practitioners go out

from Stockholm and Christiania, to other places in Europe and remoter lands; some to found independent establishments, others in response to invitations of foreign governments. In fact, within the past twenty years, a number of "Institutes for the Treatment of Disease by Swedish Movements," based on this principle of cure by physical exercise and development, have been established in all the large cities of Europe, and are making astonishing progress.

After the great international gymnastic tournament in Havre, France, in August, 1881, where more than five thousand gymnasts were assembled, those from Christiana, Norway, gained the only gold medal awarded and the jury appointed to decide upon the merits of the various systems and proficiency of the different classes of contestants, in making their official report, said, "The Swedish system is the foundation on which we shall build."

Under this system,

THE MANNER OF PERFORMING THE MOVEMENTS

is highly important. A rational use of physical exercise does not imply excessive repetition of any movements, still less an attempt to perform *all* those which lie within the reach of possibility. The human organism is limited in its action, as well on the physical as the mental side, and to go beyond that is

injurious. But within the limitations prescribed for the movements, they should be performed with great accuracy and should be well defined; not only as to form, but also as to the energy and rapidity with which they are executed. Furthermore, they should start from a right fundamental position of the whole body.

It is also very essential that they should not produce over-fatigue, nor aching of the muscles; the maxim, "If a little does good, more will do more good," to which special homage is paid by many, being an exploded theory. But we may be sure of benefit by exercise, so long as vital action (which is promoted by the movements) keeps pace with nutrition; that is, with the change of matter in the organism. Passing this limit, the contrary will be the result. By overworking the muscles they become inelastic and stiff, being thus in part unfitted for their function, and incapable of producing those easy and graceful movements to which the body is adapted in its normal development. Besides this, we have every reason for believing that overwork lays a good foundation for future diseases, of which heart disease is one example.

Hence, in taking regular hygienic exercise or a special treatment by movements, it should always be remembered that over-use of the muscles is as bad as too little use of them, and that both abuses tend to produce premature old age and death. Instead of seeking to attain the grand objects of exercise by long and severe straining of the muscles,

which is frequently done, it should be by a judicious selection in kind, conjoined with an equally careful limitation in degree, and in the duration of the exercise.

As a matter of detail, and yet of practical importance, I will add, that exercise should be taken in a well-ventilated room, and not sooner than one and a half or two hours after a full meal. It is also most essential *not to hold the breath during the movements*, but to maintain a quiet, yet deep and regular respiration.

The dress for the exercise should be as light and loose as possible, and it is especially necessary that ladies should leave off all tight clothing. In conjunction with proper exercise, the very best thing for the preservation of health is to strengthen the action of the skin by the frequent and prudent use of *cold* baths; and these I recommend to be taken in connection with gymnastic exercise, immediately preceding the latter, and before breakfast.

Believing that a selection of the best and plainest movements for the use of families, and as a guide for teachers of public and private schools, would be judicious, I append a description, with accompanying illustrations, of a complete series of movements, for the harmonious development of all parts of the body, well calculated to increase its strength and health. While all these can be used with benefit by the delicate as well as the strong of all ages and both sexes,

those persons suffering from disease should, after consultation with their physician, decide upon such movements as are especially adapted to their case.

DESCRIPTION OF PARTICULAR FORMS OF MOVEMENTS.

The fundamental position is: the heels together on one line, the feet at a right angle to each other; the knees straight; and the trunk erect; chest expanded; shoulders well drawn back and in line with each other; arms pendent, with palms turned towards the thighs, and the fingers a little bent; the head, as well as the whole body, vertical, and in a perfect balance.

ARM MOVEMENTS.

1. *Arm elevation, forwards, right to sixteen times* (*fig.* 1).

The pendent arms are quickly raised parallel, the palms facing each other, to a vertical position at each side of the head, then slowly lowered sideways till close to the sides, the fingers being kept straight with the arms.

Fig. 1.

2. *Arm flexion and extension, upwards, forwards, sideways, and backwards, six to twelve times* (*fig.* 2).

The forearms are quickly bent upwards against the upper arms, the elbows kept close to the sides, the fingers slightly bent and pointing towards the shoulders. From this position the arms are energetically stretched upwards (fig. 2, *a*) to a vertical position above the head, the palms of the hands facing each other, then bent to the former position, and from this the arms are quickly stretched horizontally forwards (fig. 2, *c*), parallel to each other, the palms still facing. The arms are again bent and then stretched horizontally sideways (fig. 5, *b*), the palms turned downwards and the arms kept well back. Now bend the arms and stretch them backwards, palms facing (fig. 2, *d*), as far as possible without too great exertion: the head and back to be kept upright during the movement.

Fig. 2


Fig. 3.

This alternate bending and stretching to be repeated as before.

3. *Shoulder rotation, ten to twenty times (fig. 3).*

The shoulders are slowly moved upwards, backwards, downwards, and forwards, so as to describe a circle.

4. *Arm flexion, forwards and throwing outwards, eight to twelve times* (*fig.* 4).

The upper arms are raised horizontally and kept well back, with the forearms sharply bent upon them (*a*), hands and fingers straight, palms turned downward. From this position the forearms are smartly and energetically thrust outwards (*b*) without any displacement of the upper arms. The forearms being again quietly bent forwards (*a*) in the same plane, the throwing motion outwards is repeated.

Fig. 4.

5. *Arm elevation, sideways, ten to twenty times* (*fig.* 5).

The stretched arms are moved slowly sideways and upwards till they attain a vertical position above the head. When horizontal, the arms are rotated backwards so as to make the palms face each other

when stretched overhead. Without delay, the arms are slowly lowered through the same plane till they re-assume the original position.

Fig. 5.

LEG MOVEMENTS.

In the following movements, the fundamental position is this: stand erect, place the hands on the hips, so that the thumb is behind, the other fingers in front, and the palms rest on the upper part of the hip bone; the elbows in the same plane as the shoulders, which are kept well back.

6. *Heel elevation, ten to twenty times* (*fig.* 6).

The heels are raised so as to throw the whole weight of the body on the toes.

7. *Knee flexion and extension, six to twelve times* (*fig.* 7).

After the heels are raised, the knees are slowly bent to right angles, being kept well out, so as to

arms just over the neck; then slowly straightened again, and the heels lowered to the ground.

8. *Alternate knee elevation, ten to twenty times* (*fig.* 8).

Fig. 8.

The knees are alternately raised to a bent position, as quickly and as high as possible, without too great exertion. Thus the weight of the body is thrown now on one foot, now on the other.

Fig. 7.

9. *Balance, leg extension, forwards and backwards, six to twelve times* (*fig.* 9).

One leg is bent upwards, so that the thigh forms a right angle with the trunk and the other leg (fig. 9). Now the foot is stretched forwards (*a*) so as to bring the calf of the leg in a straight line with the thigh. The knee should again be bent, and the whole leg slowly stretched backwards (*b*) as far as possible. Then bend the knee upwards again (fig. 9) and repeat the

Fig. 9.

movement. During the movement, the foot should be kept well stretched.

Fig. 10.

10. *Double quickstep, repeated twenty to sixty times* (*fig.* 10).

The feet are alternately and quickly thrown backwards, the weight of the body falling on the toes.

The exercise may begin in slow walking time, and gradually increase in rapidity till it attains the quickness of running.

TRUNK MOVEMENTS.

11. *Standing trunk flexion, forwards and backwards, five to ten times* (*figs.* 11 *and* 12).

Fig. 11.

The trunk is slowly bent forward (fig. 11) from the hip joints, then raised and bent backwards (fig. 12) in a similar manner, as far as the individual capacity allows; the legs being kept straight, the chest expanded, the shoulders back, and the head well raised.

Fig. 12.

12. *Trunk flexion sideways, five to ten times* (*figs.* 13 A *and* 13 B).

The trunk is slowly bent alternately to the left and right, without any twisting (fig. 13 A). The bending should be carried as far as possible without any great

Fig. 13 A.

exertion, the legs being kept straight.

13. *Trunk torsion, eight to sixteen times* (*fig.* 13).

The trunk is turned (rotated) round its long axis, alternately to the left and right, without moving the hips. The head, back, and legs are kept straight.

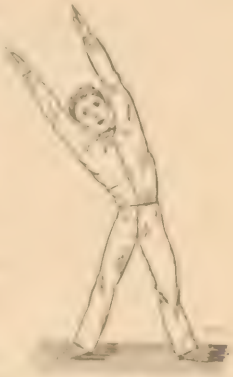

Fig. 13.

14. *Legs [illegible] apart, trunk rotation, eight to sixteen times* (*fig.* 15).

Fig. 14.

The feet are placed apart, laterally with a distance of two feet between the heels. The trunk is moved (rotated) from the waist, describing as large a circle as possible, first to the left, then to the right, as many times as stated above. The legs should be kept straight, the chest expanded, the hips and head steady.

Fig. 15.

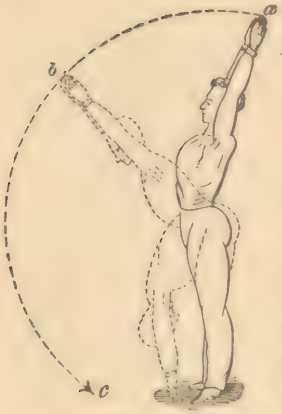

Fig. 16.

15. *Arm extension, trunk flexion, forwards and downwards, four to eight times* (*fig.* 16).

The arms are stretched over the head (*a*). The trunk is slowly bent forwards, with the back straight (*b*). Then bend the back, draw the shoulders and head a little forward, and bend down as far as possible, with the legs straight (*c*). Raise trunk, and bend backwards (fig. 17).

HEAD MOVEMENTS.

16. *Head flexion, forwards and backwards, five to ten times.*

The head is slowly bent forwards, then backwards in the same manner. The rest of the body is kept steady during the exercise.


Fig. 17.

17. *Head flexion, sideways, five to ten times.*

The head is bent alternately to the left and right. The face is kept forwards.

18. *Head torsion, eight to sixteen times* (*fig.* 18).

Fig. 18.

The head is turned alternately to the left and right, as far as convenient, without any bending of the neck or turning of the shoulders.

19. *Head rotation, five to ten times* (*fig.* 19).

The head describes, slowly, as wide a circle as possible without straining, several times to the left, and then to the right. The face is kept forwards, and the rest of the body steady.

Fig. 19.

COMPOUND MOVEMENTS.

20. *Arm elevation, forwards and upwards, and head extension, ten to twenty times.*

The arms and the heels are slowly raised at the same time (figs. 1 and 6), then the arms lowered sideways and the heels at the same time (fig. 5, *a b a*).

21. *Arm elevation, sideways, and knee flexion, six to twelve times* (*fig.* 20).

The arms are slowly raised and the knees bent at the same time (*b*). Then the arms are lowered and the knees straightened (*a*).

22. *Arm throwing, outwards, and trunk torsion, eight to sixteen times* (*fig.* 21).

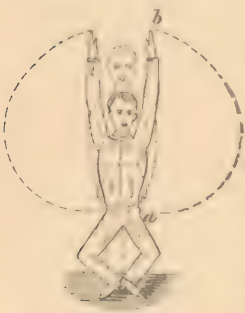

Fig. 20.

The upper arms are raised horizontally, with the forearms sharply bent upon them as in fig. 4, *a* and fig. 21, *a*. Then the forearms are *slowly* stretched outwards, and the trunk turned to the left (*b*). Then the arms are slowly bent, and the trunk turned forwards, and so in the same manner to the right.

23. *Outfall. Alternating position, with feet and arms; changing eight to sixteen times* (*fig.* 22).

Position. — The feet are placed at right angles, heels together. The arms are bent at the elbow, fingers pointing towards the shoulders (as in No. 2). Now the left foot is moved outwards, in the direction of its length, and placed on the floor at a distance of three foot-lengths from the heel of the right foot. At the moment the foot

Fig. 21.

touches the floor, the left knee is bent so as to come just over the toes, and the weight of the body is thrown on this leg. The other leg is kept straight so as to form one slanting line with the trunk and head. At the same time the left foot is assuming this position, the left arm is stretched above the head, and the right one backwards. Now the original position is resumed (heels together, arms bent), and the same movement performed on the opposite side, by the right foot and arm.

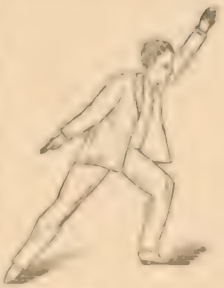

Fig. 22.

24. *Arm extension, bending knee forward, three or six times* (*fig.* 23).

Position. — The arms are stretched over the head, the right leg backwards. Now the left knee is bent to a right angle; the body is bent forward nearly horizontal, so that the body from the right heel to the fingers makes a slight curve, the shoulders and head being drawn backwards. This position is kept a short

Fig. 23.

time, and then the body is slowly raised, and the left knee straightened. The same movement is performed with the right leg bent.

I have arranged the above movements in groups or sets, as indicated in the following tablets, for convenience of use, and with a certain relation to a progressive muscular development.

BRIEF RECAPITULATION OR TABLE OF MOVEMENTS.

Table No. 1 a.

		Number.
1.	Arm elevation, forwards, upwards	1
2.	Heel elevation	6
3.	Trunk flexion, forwards, backwards	11
4.	Head flexion, forwards, backwards	16
5.	Arm extension	2
6.	Knee elevation	8
7.	Trunk torsion	13
8.	Double quickstep	18
9.	Shoulder rotation	3

Table No. 1 b.

		Number.
1.	Arm extension	2
2.	Knee flexion	7
3.	Trunk flexion, sideways	12
4.	Head flexion, sideways	17
5.	Arm throwing, outwards	4
6.	Leg elevation, forwards, backwards	9
7.	Trunk rotation	14
8.	Head rotation	19
9.	Arm elevation, sideways	5

Table No. 2.

		Number.
1.	Arm elevation, sideways, and knee flexion	21
2.	Trunk flexion, forwards, downwards, backwards	15
3.	Head flexion, forwards, backwards	16
	and rotation	19
4.	Outfall	23
5.	Shoulder rotation	3
6.	Leg extension, forwards, backwards	9
7.	Arm throwing, outwards, and trunk torsion	22
8.	Double quickstep	10
9.	Arm elevation, forwards, and heel elevation,	20

Table No. 3.

		Number.
1.	Arm extension	8
2.	Knee elevation	1
3.	Extension stride standing, trunk rotation	14
4.	Head rotation	19
5.	Arm throwing, outwards, and knee flexion	4 and 7
6.	Arm extension, trunk flexion, sideways (fig. 13 B)	12
7.	Arm elevation, forwards	1
8.	Arm extension, leg balance, knee flexion	24
9.	Arm throwing, outwards, and trunk torsion,	22
10.	Shoulder rotation	3

Numbers 1 *a* and 1 *b* should be alternated in use, so that each shall be practised every other day for one month.

No. 2 should be practised daily the second month, and No. 3 the third month. After that time one's own judgment will be a sufficient guide for further practice.

An exercise of from fifteen to thirty minutes daily, in these movements, will soon demonstrate their great benefit. They are especially to be recommended to those who lead a sedentary life, as a means of prevention and cure of many functional and nervous derangements.

Although it is undoubtedly true that the movements here given are sufficient without apparatus, still the Swedish system admits of certain simple appliances which may be used with advantage.

The best contrivance I have knowledge of for home use is "Gifford Brothers' Health-Exercising Apparatus." With thorough instruction, and in careful hands, the inventions of these gentlemen may be turned to good account.